

CLAIMS

1. A vesicle comprising
- 5 a) an inner layer which comprises a phospholipid, and
b) an outer layer which comprises calcium phosphate.
2. A vesicle according to claim 1 wherein the phospholipid is selected from L- α -phosphatidylcholine and L- α -phosphatidylserine.
3. A hydrophobic droplet comprising
- 10 a) a hydrophobic core,
b) an inner layer which comprises a surfactant, and
c) an outer layer which comprises calcium phosphate.
4. A droplet according to claim 3 wherein the hydrophobic core comprises a solid or liquid hydrocarbon or lipid.
5. A droplet according to claim 3 or claim 4 wherein the surfactant is an anionic surfactant.
6. A vesicle or droplet according to any one of the preceding claims wherein the outer layer further comprises ions selected from carbonate, hydrogen phosphate, chloride, fluoride or magnesium.
7. A vesicle or droplet according to any one of the preceding claims
- 20 wherein the thickness of the outer layer is from 5 to 50 nm.
8. A vesicle or droplet according to claim 7 wherein the thickness of the outer layer is from 5 to 20 nm.
9. A vesicle or droplet according to claim 8 wherein the thickness of the outer layer is about 10 nm.
10. A vesicle or droplet according to any one of the preceding claims wherein the size of the vesicle or droplet is from 100 nm to 10 μ m.
11. A vesicle or droplet according to claim 10 wherein the size of the vesicle or droplet is at least 300 nm.
12. A vesicle or droplet according to claim 11 wherein the size of the
- 30 vesicle or droplet is at least 1 μ m.
13. A vesicle or droplet according to any one of the preceding claims

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which further comprises a pharmaceutically active compound.

14. A vesicle or droplet according to claim 13 wherein the pharmaceutically active compound assists the binding of a coating comprising the vesicle or droplets to bone, treats a specific bone disease or any diseased region adjacent to bone, or relieves pain.

15. A vesicle or droplet according to claim 14 wherein the pharmaceutically active compound is selected from parathyroid hormone, vitamin D derivatives, bisphosphonates, bone morphogenetic proteins, analgesics, ^{32}P or ^{89}Sr containing compounds, indomethacin, prostoglandins, interleukin 6 inhibitors and antibiotics.

16. A process for preparing a vesicle as claimed in any one of claims 1, 2 or 6 to 15, which process comprises

- a) forming a vesicle in an aqueous mixture comprising a phospholipid, and
- b) calcifying the vesicle by contacting said vesicle with an aqueous solution comprising calcium and phosphate ions.

17. A process for preparing a hydrophobic droplet as defined in any one of claims 3 to 15 which process comprises

- a) forming a hydrophobic droplet in an aqueous mixture comprising a hydrophobic liquid or solid and a surfactant, and
- b) calcifying the droplet by contacting said droplet with an aqueous solution comprising calcium and phosphate ions.

18. A process according to claim 16 or claim 17 wherein the aqueous mixture further comprises an alcohol.

19. A process according to claim 18 wherein the alcohol is selected from methanol, ethanol, propanol and butanol.

20. A process according to claim 18 or claim 19 wherein the concentration of alcohol is no more than 10% by volume of the aqueous mixture.

21. A process according to any one of claims 16 to 20 wherein the ratio of calcium to phosphate ions in the aqueous solution is from 1:1 to 2:1.

22. A process according to claim 21 wherein the ratio of calcium to

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phosphate ions is from 1.4:1 to 2:1.

23. A process according to claim 22 wherein the ratio of calcium to phosphate ions is about 1.5:1.

24. A vesicle according to claim 1 prepared by the process according to any one of claims 16 or 18 to 23.

25. A droplet according to claim 3 prepared by the process according to any one of claims 17 to 23.

26. A solid substrate wherein regions of said substrate have attached thereto a layer comprising vesicles or droplets as claimed in any one of claims 1 to 15, 24 or 25 with other region or regions having no vesicles or droplets attached thereto.

27. A substrate according to claim 26 which comprises

- a) electrically conducting and non-conducting regions on its surface, and
- b) a layer comprising vesicles or droplets on the conducting regions.

28. A substrate according to claim 27 wherein the non-conducting regions are from 10 μm to 2 mm in size.

29. A substrate according to claim 28 wherein the non-conducting regions are about 150 μm in size.

30. A process for preparing a substrate according to any one of claims 26 to 29 which process comprises electrolytically depositing the coating comprising vesicles or droplets onto the conducting regions of the substrate.

31. A substrate according to claim 26 prepared by the process according to claim 30.

32. A substrate according to any one of claims 26 to 29 for use in the treatment of the human or animal body.

33. Use of a substrate according to any one of claims 26 to 29 in the manufacture of a medically acceptable implant the treatment of bone disorders or in the delivery of pharmaceutically active compounds.

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